

Application No. 10/665,100
Amendment dated November 12, 2004
Reply to Office Action of July 12, 2004

Docket No. 1232-5157

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-9 (CANCELLED):

10 (NEW): A position determination method of determining positions of a plurality of regions on an object, said method comprising:

a detection step of detecting an image of a mark on each of a plurality of regions on the object to generate image data;

a first obtaining step of obtaining a position of the mark in the image data with respect to each of the plurality of regions by processing the image data with a first method;

a second obtaining step of obtaining a position of the mark in the image data with respect to each of the plurality of regions by processing the image data with a second method;

a third obtaining step of obtaining an expression approximately representing the positions of the plurality of regions with respect to each set of the obtained positions, each of the obtained positions being obtained in one of said first and second obtaining steps;

an evaluation step of evaluating approximation degrees of the expressions obtained in said third obtaining step; and

a selection step of selecting one of the first and second methods with respect to each of the marks based on evaluation results in said evaluation step.

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11 (NEW): A method according to claim 10, wherein said evaluation step includes calculating difference between a position of the mark obtained by the expression and the corresponding position used for obtaining the expression.

12 (NEW): A method according to claim 10, wherein the first and second methods are template matching methods of which templates are different from each other.

13 (NEW): A method according to claim 10, wherein the first and second methods are template matching methods of which window widths set on the image data are different from each other.

14 (NEW): A method according to claim 10, wherein the first and second methods calculate first and second local maximum slope positions different from each other, respectively.

15 (NEW): A method according to claim 10, wherein in said selection step one of the first and second methods are selected with respect to each of the plurality of regions.

16 (NEW): A method according to claim 10, wherein in said selection step one of the first and second methods are selected with respect to each of the marks.

17 (NEW): A position determination apparatus for determining positions of a plurality of regions on an object, said apparatus comprising:

a detection system which detects an image of a mark on each of a plurality of regions on the object to generate image data;

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a first processing unit which obtains a position of the mark in the image data with respect to each of the plurality of regions by processing the image data with a first method, and obtains a position of the mark in the image data with respect to each of the plurality of regions by processing the image data with a second method; and

a second processing unit which obtains an expression approximately representing the positions of the plurality of regions with respect to each set of the obtained positions, each of the obtained positions being obtained with one of the first and second methods, evaluates approximation degrees of the expressions, and selects one of the first and second methods with respect to each of the marks based on the evaluation results.

18 (NEW): An apparatus according to claim 17, wherein said second processing unit evaluates the approximation degree by calculating difference between a position of the mark obtained by the expression and the corresponding position used for obtaining the expression.

19 (NEW): An apparatus according to claim 17, wherein the first and second methods are template matching methods of which templates are different from each other.

20 (NEW): An apparatus according to claim 17, wherein the first and second methods are template matching methods of which window widths set on the image data are different from each other.

21 (NEW): An apparatus according to claim 17, wherein first and second local maximum slope positions different from each other are calculated with the first and second methods, respectively.

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22 (NEW): An exposure apparatus for exposing a substrate to a pattern, said apparatus comprising a position determination apparatus as recited in claim 17.

23 (NEW): A device manufacturing method comprising steps of exposing a substrate to a pattern using an exposure apparatus as recited in claim 22; and developing the exposed substrate.